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UNIVERSITY OF CALIFORNIA
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION

PROJECT NO. 1686

REPORTED BY H. B. Schultz

Davis - Ag Engineering
Campus and Division or Department

DATE January 13, 1958

Annual Summary Statement of Progress for year ending Dec. 31, 1957
This Summary is in addition to, not in place of, more complete reports of progress prepared periodically and at least once a year with a deadline of Feb. 1.

Title: PEAT LAND CONSERVATION

Personnel: H. B. Schultz, Department of Agricultural Engineering

Principal results of year:

A spot climate station was operated on Rindge Island for the third year. The evaluation of the wind recordings for the season March to September again showed the predominance of the W and WNW directions for high velocities. In 1956, the percentage of these westerly directions was not so pronounced in the spring, and the increase toward the summer months was gradual. In 1957, the picture was similar, but the contrast between early spring and summer was sharper. With beginning of May the summer regime was already established (91 percent of all strong winds from W or WNW). This result may be important because artificial wind protection devices might only be needed from May on, and therefore only one orientation of protecting rows would be required. The months before May belonging to the rainy season might not be critical as wetting of the soil takes place, and secondly, the 1957 season again revealed that the peak-frequency of strong winds doesn't occur before May.

In order to get more detailed information about the length of the period requiring wind protection, a break up into ten-day periods was made, using the records of all three years. They show that the critical wind speeds, after their peak-occurrence in May, decrease only slowly during the first two decades of June, but sharply thereafter. If future recordings corroborate this result, proper timing for protection of the soil from blowing could be recommended.

Testing of wind protecting devices in the field by means of wind profile measurements.

A 15-foot mast for anemometers was mounted on a lightweight trailer so that it could be readily moved to several test sites during a stormy period. For each site a 30-minute average of the velocities along the mast was determined. All data were obtained under "blowing dust" conditions.

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Publications:

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Using the power law for increase of wind speed with height the exponent n was calculated. Its values varying between 1.2 and 7 were considered by some investigators as roughness-parameters for air flowing over fields with different ground cover. Our results ranged from 2.0 between snow-fences when topped by one foot of fern to n = 5.6 in wind blowing parallel to unprotected asparagus ridges.

However, more important than a parameter for air flow structure should in the present project be a parameter for the wind impact on the soil. By plotting all profiles on log-log paper with the level of the soil surface in between the ridges as zero-plane, it was discovered that the obtained data failed to fulfill the power law to a varying degree. A shift of the zero-plane to another level was necessary which was made graphically. This shift, the "zero-plane-displacement" d, then gives the height of the "active", sometimes called "equivalent", or "virtual" zero-plane for the various field conditions. In unprotected fields; d was 10 to 15 cm <u>below</u> ridge height. Four foot snow fences in distances of 70 feet were not efficient enough, having a d of around zero. Barley interplantings resulted in lifting the virtual surface to 10 or more cm <u>above</u> ridge height.